

REMARKS

Claims 1, 2, 4-21 are currently pending in the present application. Reexamination and reconsideration of the application are respectfully requested.

REJECTION OF CLAIMS UNDER 35 U.S.C. 102

Claims 1 and 2 are rejected under 35 U.S.C. 102 for the reasons set forth on page 2 of the Action. Specifically, claims 1 and 2 are rejected under 35 U.S.C. 102 as being anticipated by Gu (US Pat. No. 5,697,088), which is hereinafter referred to as "Gu" or as "the Gu reference."

The rejections under 35 U.S.C. 102 are respectfully traversed, and reconsideration and reexamination of the application is respectfully requested for the reasons set forth herein below.

The Federal Circuit has ruled, "Under 35 U.S.C. §102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art. . . . In addition, the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public." Akzo N.V. v. United States Int'l Trade Comm'n, 1 USPQ 2d 1241, 1245 (Fed. Cir. 1986), cert. denied, 482 U.S. 909 (1987). [emphasis added.]

Furthermore, the Federal Circuit has held, "Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration." W.L. Gore & Assocs. v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). [emphasis added.]

Paragraph 3 on page 2 of the Action identifies those elements of the Gu reference that describe or otherwise anticipate the elements as claimed. Specifically,

the Office Action asserts that component 600 of FIG. 8 and column 4, lines 35-40 of the Gu reference teach the apparatus as claimed.

It is respectfully submitted that Gu fails to teach or suggest each and every element of the component as claimed. For example, regarding claim 2, the Gu reference fails to teach or suggest *inter alia* the following claim limitations: “wherein the balun is for one of moving a signal from a differential form to a single ended form and moving a signal from a single ended form to a differential form.”

First, it appears that Gu’s disclosure of its balun transformer is limited to taking an unbalanced or single-ended signal and transforming it to a balanced or differential signal. See col. 1, lines 14-16, col. 2, lines 15-21, col. 4, lines 38-40. For example, in each of these descriptions provided by Gu, the balun transformer of Gu “takes the unbalanced (single-ended) signal and transforms it to a balanced (differential) signal.” (Col. 4, lines 38-40) Consequently, it is respectfully submitted that Gu does not fairly teach or suggest a balun “for moving a signal from a differential form to a single ended form,” as claimed.

In view of the foregoing, it is respectfully submitted that Gu reference, whether alone or in combination, fails to teach or suggest integrating a filter and balun into a single component as claimed.

REJECTION OF CLAIMS 4-12 AND 14-16 UNDER 35 U.S.C. 103

Claims 4-21 are rejected under 35 U.S.C. 103 for the reasons set forth beginning on the top of page 3 and continuing through the top of page 4 of the Action. Specifically, claims 4-12, 16, and 20-21 are rejected under 35 U.S.C. 103 as being

unpatentable over Gu (US Pat. No. 5,697,088), in view of Frank et al. (US Pat. No. 6,542,055) which is hereinafter referred to as “Frank” or as “the Frank reference.”

The rejections under 35 U.S.C. 103 are respectfully traversed, and reconsideration and reexamination of the application is respectfully requested for the reasons set forth hereinbelow.

The Action on page 3 proposes a combination the resonator filter design of Frank et al. with the balun transformer of Gu. This combination is contested as improper for the reasons advanced below. However, even if this combination were proper, which is not conceded, the resulting combination would still fail to teach or suggest multiple stages and resonator-based implementations the claimed invention.

For example, the resulting combination of Gu and Frank fails to fairly teach or suggest *inter alia* the following claim limitation: “filter that includes a single ended input and a single ended output,” as claimed in claim 13. It appears that the resonator-filter design of Frank discloses a differential input and a differential output (see FIG. 4A, positive and negative input ports on the left side and positive and negative outputs (C and D) on the right side) and not the invention as claimed.

As another example, regarding claim 18, the resulting combination of Gu and Frank fails to fairly teach or suggest *inter alia* the following claim limitations:

“a single ended input, a differential output, a first stage, and a second stage coupled to the first stage; wherein the balun is in the first stage; wherein the single ended port of the balun is coupled to the singled ended input of the component; wherein the filter is in the second stage; wherein the differential input of the filter is coupled to the differential port of the balun; and wherein the differential output of the filter is coupled to the differential output of the component,” as claimed in claim 18.

It is noted that claims 14, 15, and 19 also further recite language directed to multiple stages (e.g., a first stage and second stage).

Neither the Gu reference nor the Frank reference fairly teaches a first stage and a second stage and the specific coupling therebetween as claimed. In Gu's balun transformer design, the tuning capacitors are embedded in and distributed through the two quarter wave couplers so there is no concept of a "first stage" and "second stage" as claimed. Similarly, in the Frank reference, there is a ladder circuit and lattice circuit, which in combination form a resonator filter "that may be used in a differential circuit or when the circuit must both filter and convert from differential to single-ended." However, as in the Gu design, Frank's resonator filter design does not have a "first stage" and "second stage," where one of the stages is the balun and the next stage is a filter, as claimed.

THE PROPOSED COMBINATION IS BASED ON IMPERMISSIBLE USE OF THE CLAIMED INVENTION AS A TEMPLATE TO PIECE TOGETHER THE TEACHINGS OF THE GU REFERENCE AND FRANK REFERENCE.

The Action states that Gu teaches the component of the claimed invention. The Action further states that the Gu reference fails to teach or suggest "a single-ended input and single-ended output filter, differential inputs and differential outputs, or resonator-based filter, half-ladder resonator-based filter, full-ladder resonator-based filter, lattice resonator-based filter, lumped elements that include inductors and capacitors, film bulk acoustic resonators (FBARs), or surface acoustic wave (SWA) technology," as claimed.

The Frank reference is cited for teaching all the deficiencies of the Gu reference. The Action proposes the combination of Gu's balun transformer with tuning capacitors with Frank's balun and filter design.

It is respectfully submitted that Gu and Frank are improperly combined. It appears that the Action uses improper hindsight to selectively pick pieces from Gu and other pieces from Frank to arrive at the claimed invention.

First, it is respectfully submitted that neither the Gu reference nor the Frank reference explicitly or implicitly teaches or suggests any motivation to 1) combine the Frank's filter and balun design with Gu's balun transformer design and 2) apply Frank's resonator-based technology and FBAR technology to Gu's balun transformer.

The Action suggests that the balun transformer of Gu be modified with the balun/filter design of Frank. However, the Federal Circuit has stated, “The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” In re Fritch, 972 F.2d 1260, 23 USPQ 2d 1780, 1783–84 (Fed. Cir. 1992) [emphasis added].

The Federal Circuit has further held In re Fritch, 972 F.2d 1260, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992):

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. … “[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art … would lead that individual to combine the relevant teachings of the references. In re Fine, 837 F.2d 1071, 1074, 5 USPQ 2d 1596, 1598 (Fed. Cir. 1988). [emphasis added.]

The Action on page 3 cites, “reducing system cost, removing/reducing noise, or passing only a certain frequency” as the motivation to combine Gu and Frank. Specifically, the portion states, “the inclusion of the filter that is taught by Frank et al. in Gu would have been obvious because the filter implemented with the balun as a

single component, for reducing the system cost, may be used to remove/reduce noise or to pass only certain frequency.” However, it is respectfully suggested that this quoted portion from the Action is deficient and would not have motivated one of ordinary skill in the art to combine the pieces of Gu and Frank in the manner suggested by the Action.

Consequently, it appears that the current patent application has been improperly used as a basis for the motivation to combine or modify the components selected from Gu and Frank to arrive at the claimed invention. Stated differently, the proposed combination of the cited references appear to be based on hindsight since the cited references do not teach or suggest a motivation to combine the respective elements of each reference in the manner proposed by the Action.

The Federal Circuit has held, “It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated, “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988)), In re Fritch, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992). [emphasis added.]

Furthermore, the Federal Circuit has held, “The combination of elements from non-analogous sources, in a manner that reconstructs the applicant's invention only with the benefit of hindsight, is insufficient to present a *prima facie* case of obviousness. There must be some reason, suggestion, or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge can not come from the applicant's invention itself.” In re Oetiker, 977 F.2d 1443, 24 USPQ 2d 1443, 1446 (Fed. Cir. 1992)

Accordingly, hindsight reconstruction may not be used to pick a component from Gu and another component from Frank to arrive at the invention as claimed. Accordingly, it is respectfully requested that the rejection of claims 4-21 under 35 U.S.C. 103(a) be withdrawn.

Moreover, the Federal Circuit has stated in McGinley v. Franklin Sports Inc., 60 USPQ 2d 1001, 1010 (Fed. Cir. 2001):

We have noted elsewhere, as a "useful general rule," that references that teach away cannot serve to create a prima facie case of obviousness. In re Gurley, 27 F.3d 551, 553, 31 USPQ 2d 1130 (Fed. Cir. 1994). If references taken in combination would produce a "seemingly inoperative device," we have held that such references teach away from the combination and thus cannot serve as predicates for a prima facie case of obviousness. In re Sponnoble, 405 F.2d 578, 587, 160 USPQ 237, 244, 56 C.C.P.A. 823 (1969) (references teach away from combination if combination produces seemingly inoperative device); see also In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (inoperable modification teaches away).

The proposed combination of the balun transformer of Gu with the various filters of Frank produces a "seemingly inoperative device" for the following reasons. First, as described earlier, the Gu balun transformer does not have the concept of two stages, where one stage is the balun, and the second stage is a filter or visa-versa as in the claimed invention. Instead, the six tuning elements (i.e., capacitors) employed by Gu appear to be embedded in the quarter wave couplers and to be located at different ports (e.g., capacitors C_p1 and C_s1 are located at port 1, whereas capacitors C_p2, C_s2, C_p3 and C_s3 are located at ports 2 and 3, respectively).

Similarly, the resonator filter of Frank does not employ stages as the claimed invention. In this regard, it is very difficult if not impossible to successfully combine

Gu's quarter wave couplers (one in a specific open circuit configuration and the other in a short circuit configuration) and tuning capacitors with Frank's ladder circuit, lattice circuit and FBAR technology without further enabling teaching or enabling disclosure, which is missing from the cited references.

Second, it is respectfully submitted that Gu's balun transformer and filter design is very different from Frank's design for an integrated filter balun. For example, Gu appears to implement the balun transformer with the first and second transmission line couplers (202, 204), one of which is in an asymmetrical open circuit configuration and the other is configured in an asymmetrical short circuit configuration.

FIG. 8 of the Gu reference shows an element labeled "BPF" 600, which is described in col. 4, lines 35-38 as "bandpass filter which combines the functionality of a balun transformer and a two-pole bandpass filter." It is respectfully noted that Gu only discloses the functionality of a specific type of filter (i.e., a two pole bandpass filter) that is combined with a specific implementation (i.e., quarter wave couplers, where one is in an asymmetrical open circuit configuration and the other is in an asymmetrical short circuit configuration) of a balun transformer illustrated in FIG. 2 of Gu.

The bandpass filter 600 incorporates "the balun transformer 200 described in FIG. 2." (see col. 3, lines 63-65) Also, the bandpass filter 600 includes "the first and second quarter wave couplers 202, 204 as well as several tuning elements, shown here as capacitors C_s1, C_s2, C_s3, C_p1, C_p2, and C_p3." (col. 3, line 65 to col. 4, line 1) Also, these capacitors are referred to as "tuning elements" that are "coupled to the input port 1, and the first and second output ports 2, 3." (col. 4, lines 1-3) Moreover,

the tuning elements “C_s1, C_s2, C_s3, C_p1, C_p2, and C_p3 provide frequency selectivity for the bandpass filter 600.” (col. 4, lines 2-5)

In contrast, Frank’s balun and filter design, shown in FIG. 4A, is directed to “an N-stage ladder circuit is serially connected to a bridge lattice circuit. The N-stage ladder circuit receives differential inputs, e.g. mixers, while the bridge lattice circuit outputs a singled end output, e.g. amplifier. In a second embodiment, a bridge lattice circuit is serially connected to an N-stage ladder circuit. The bridge lattice circuit receives a differential source while the N-stage ladder circuit drives a differential output load.”

(See Summary of Invention)

Furthermore, the N-stage ladder circuit of Frank is “serially connected to a bridge lattice circuit at nodes A and B. For each step of the ladder, the rails are a pair of FBARs at the first resonant frequency (F_A) and the rung is an FBAR at the second resonant frequency (F_B). The lattice circuit is a ring of alternating FBARs at F_A and FBARs at F_B. The differential output is shown at nodes C and D.”

It is respectfully submitted that Frank’s “N-stage ladder circuit serially connected to a bridge lattice circuit” is very different from Gu’s “first and second quarter wave couplers 202, 204 with tuning capacitors.” Moreover, it is respectfully submitted that one skilled in the art would not combine such divergent designs by selectively picking components of one design and incorporating the same into the other design.

Moreover, the Frank reference states [It is] “preferable that a film bulk acoustic resonator (FBAR) be used in the combination ladder and lattice structure. This provides the necessary band-pass functionality and makes the transition from differential to single ended load where necessary.” It is respectfully submitted that a ladder and lattice

circuit implemented with FBAR technology and taught by the Frank reference is very different from transmission line couplers (one of which is in an asymmetrical open circuit configuration and the other is configured in an asymmetrical short circuit configuration) taught by the Gu reference. Additionally, the Gu reference does not appear to use, nor does it even mention, FBAR technology.

Additionally, it is respectfully submitted, even if Gu and Frank were properly combined, which is not conceded, such a combination would not be enabling since one skilled in the art would require much more additional teaching than “routine skill in the art” and simple “re-arrangement” as suggested by the Action on page 3-4.

Consequently, it is respectfully submitted that the Gu reference and the Frank reference teach away from the proposed combination and that the Gu reference and the Frank reference cannot serve to create a *prima facie* case of obviousness.

It is respectfully submitted that the references do not suggest the desirability of the suggested modification. In fact, it appears that the references would suggest against such a modification because the design approach of Gu is so different from the design approach of Frank.

Dependent claims 4-12, 14-16, 18-21 incorporate all the limitations of independent claims 1, 13, and 17, respectively. In this regard, the dependent claims also add additional limitations, thereby making the dependent claims *a fortiori* and independently patentable over the cited references. After a review of the cited references, there does not appear to be any teaching of the specific claims limitations recited by the dependent claims. In this regard, it is respectfully requested that the next Action specifically point out those portions of the cited references that teach or suggest the specific recited elements in the claimed invention.

In view of the foregoing, it is respectfully submitted that Gu reference, whether alone or in combination with Frank, fails to teach or suggest the component as claimed.

Accordingly, it is respectfully requested that the claim rejections under 35 U.S.C. section 103(a) be withdrawn.

Conclusion

For all the reasons advanced above, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the pending claims are requested, and allowance is earnestly solicited at an early date. The Examiner is invited to telephone the undersigned if the Examiner has any suggestions, thoughts or comments, which might expedite the prosecution of this case.

Respectfully submitted,

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(Date)